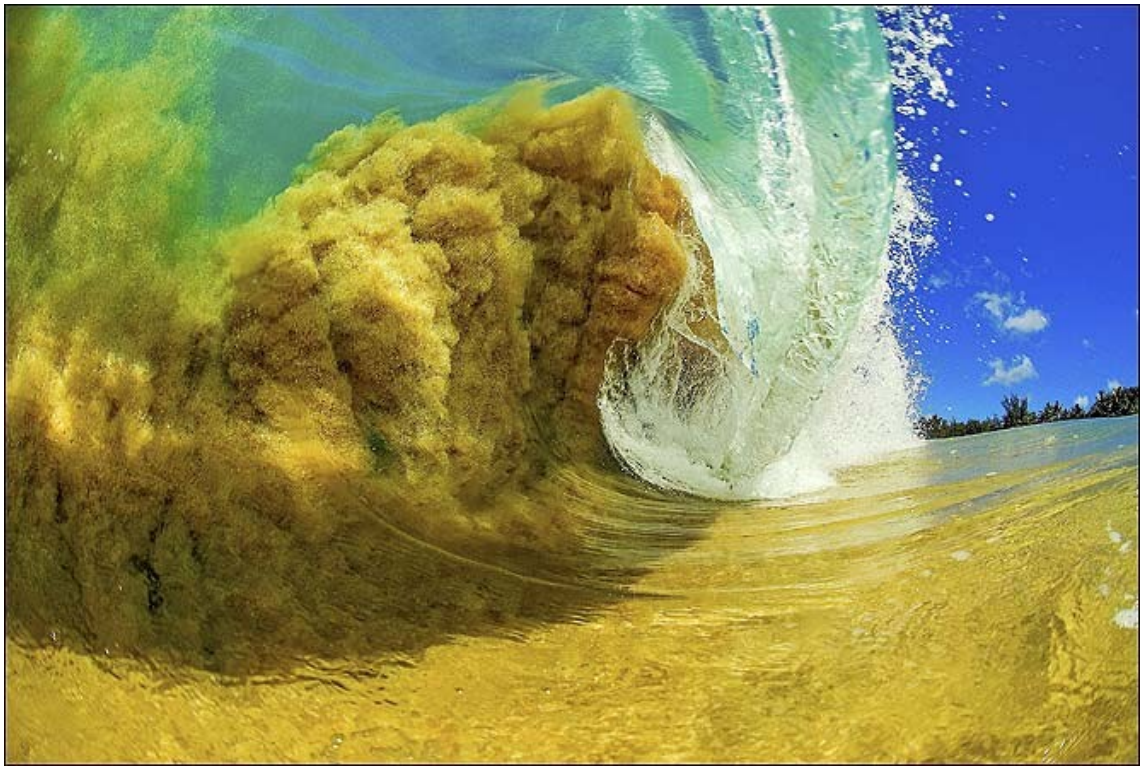
86th CERB
3-4 June 2009

Los Angeles District Activities and Data Utilization

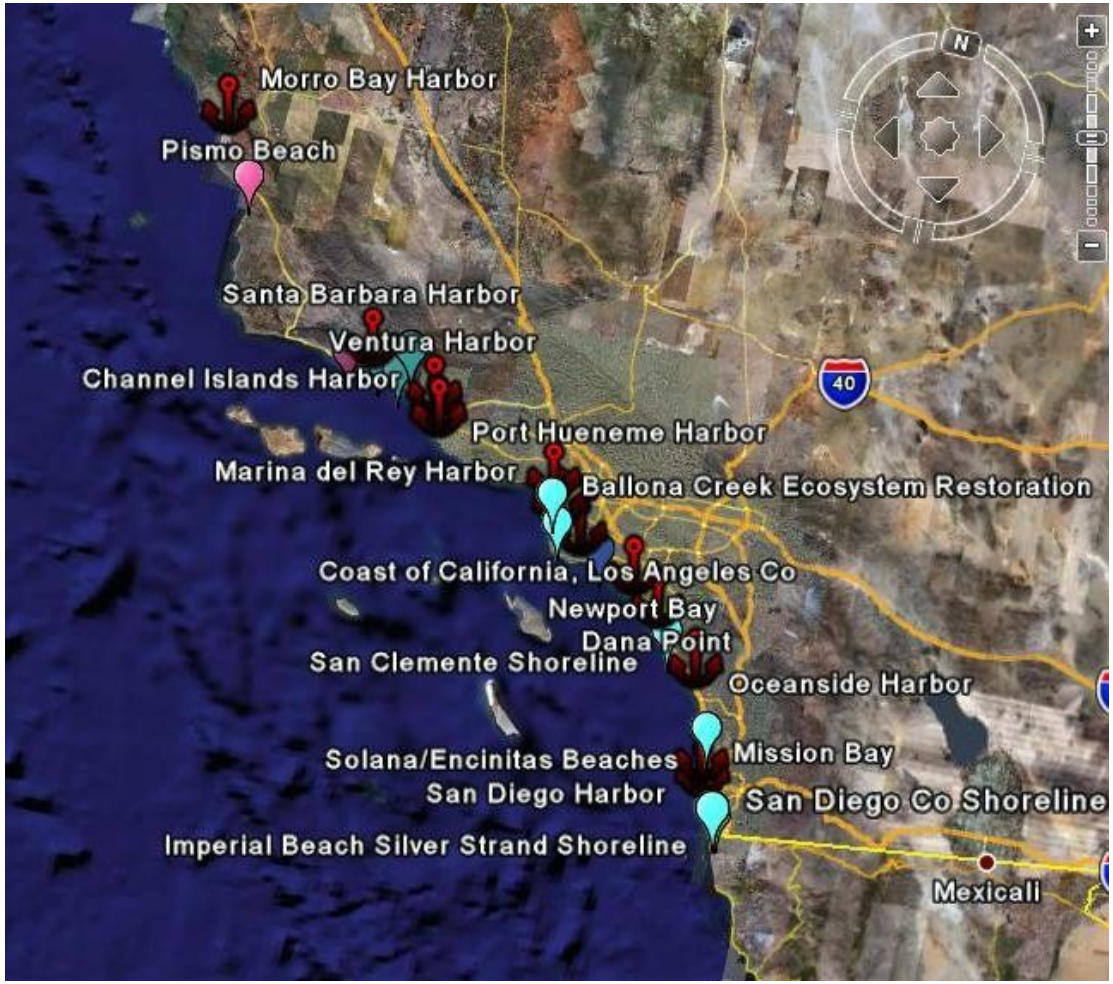
Arthur T. Shak, SPL

- Navigation
- Shore Protection (HSDR)
- Ecosystem Restoration
- Multi-Purpose

- Planning
- Regional Studies
- Design
- Construction
- Operations
- Maintenance
- Regulatory



SPL COASTAL PROJECTS

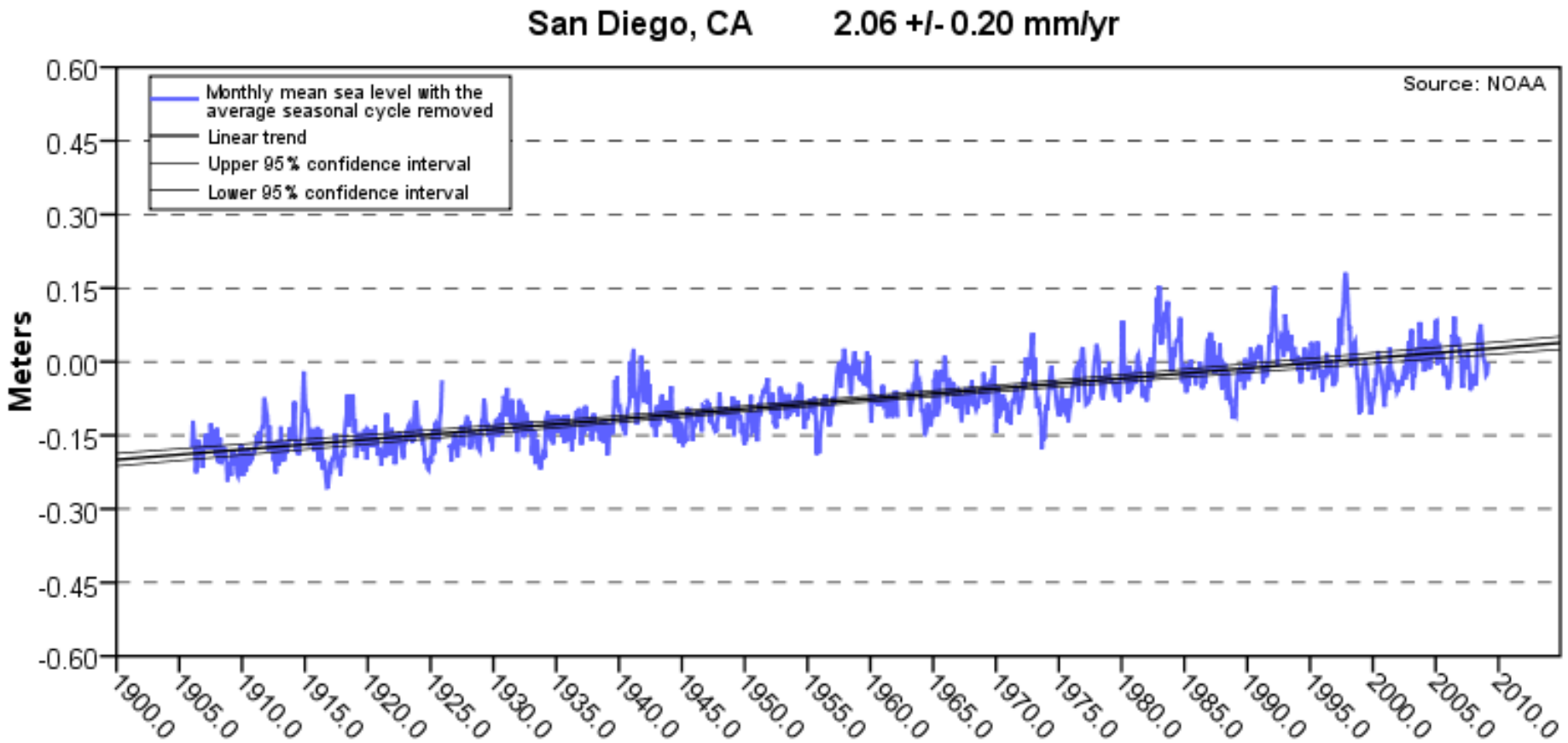


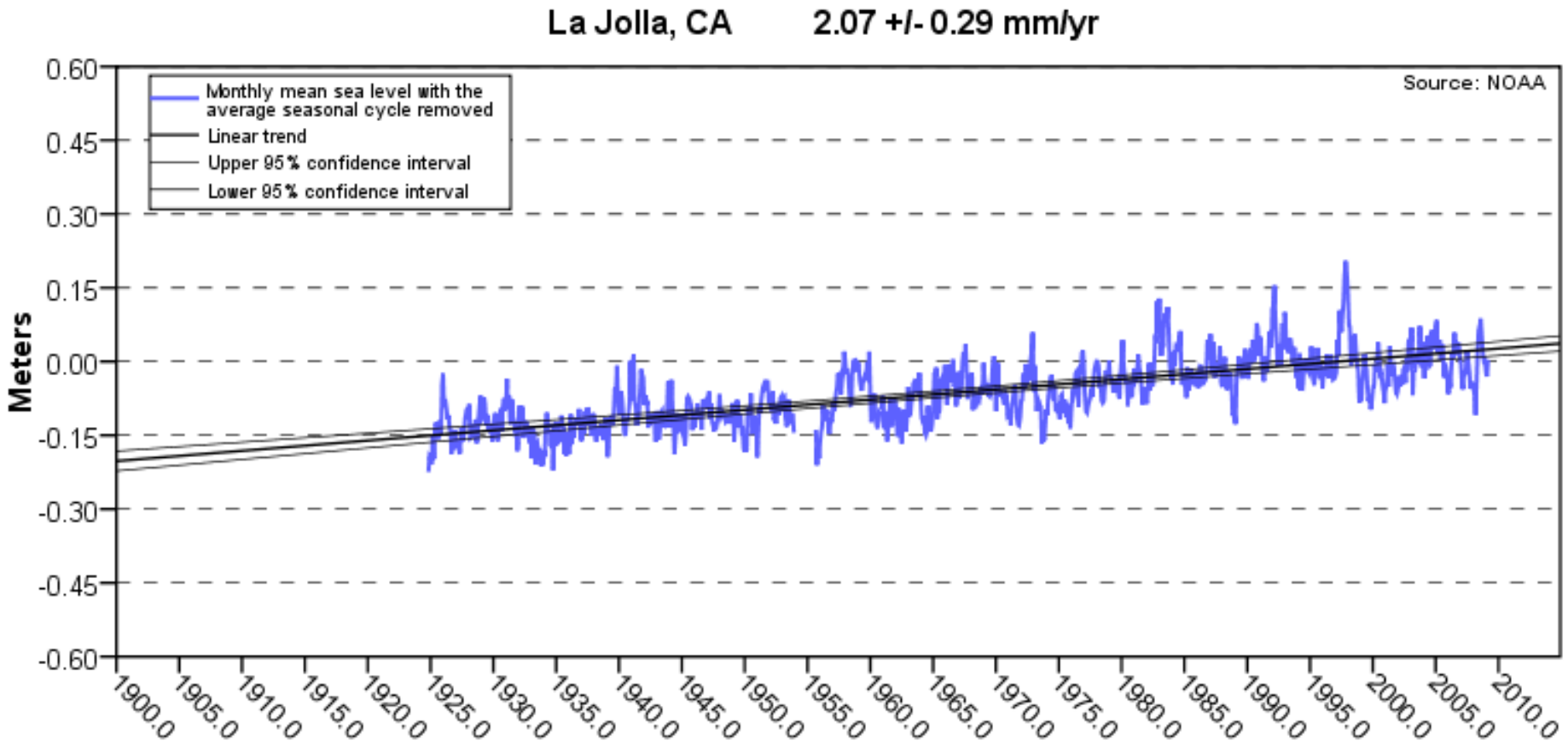
- Coastal Studies (14)
- Regional Studies (3)
- State-wide Sediment Master Planning
- Harbors (14, 4 deep-draft)
- Beach Nourishment Projects (3)

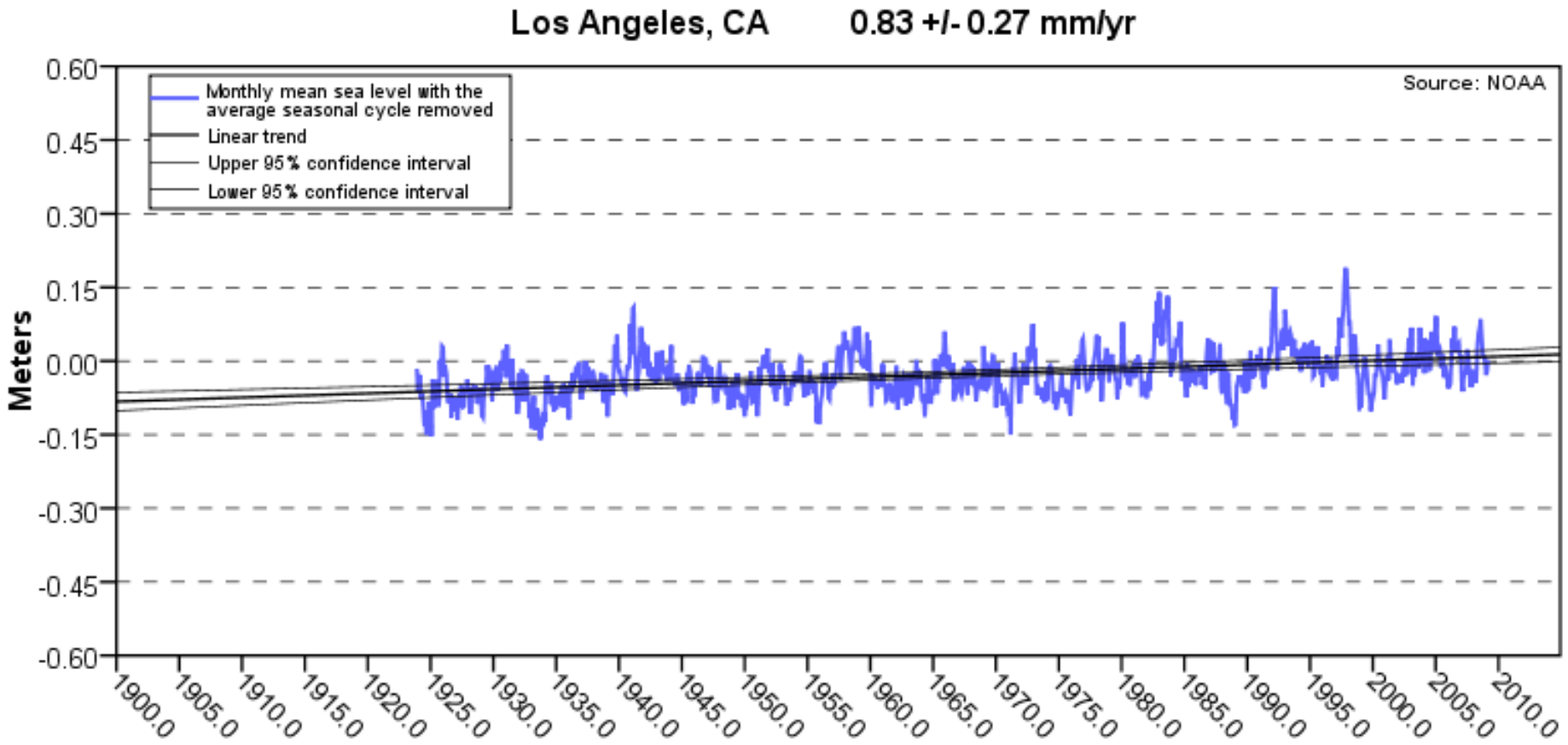
DATA UTILIZATION

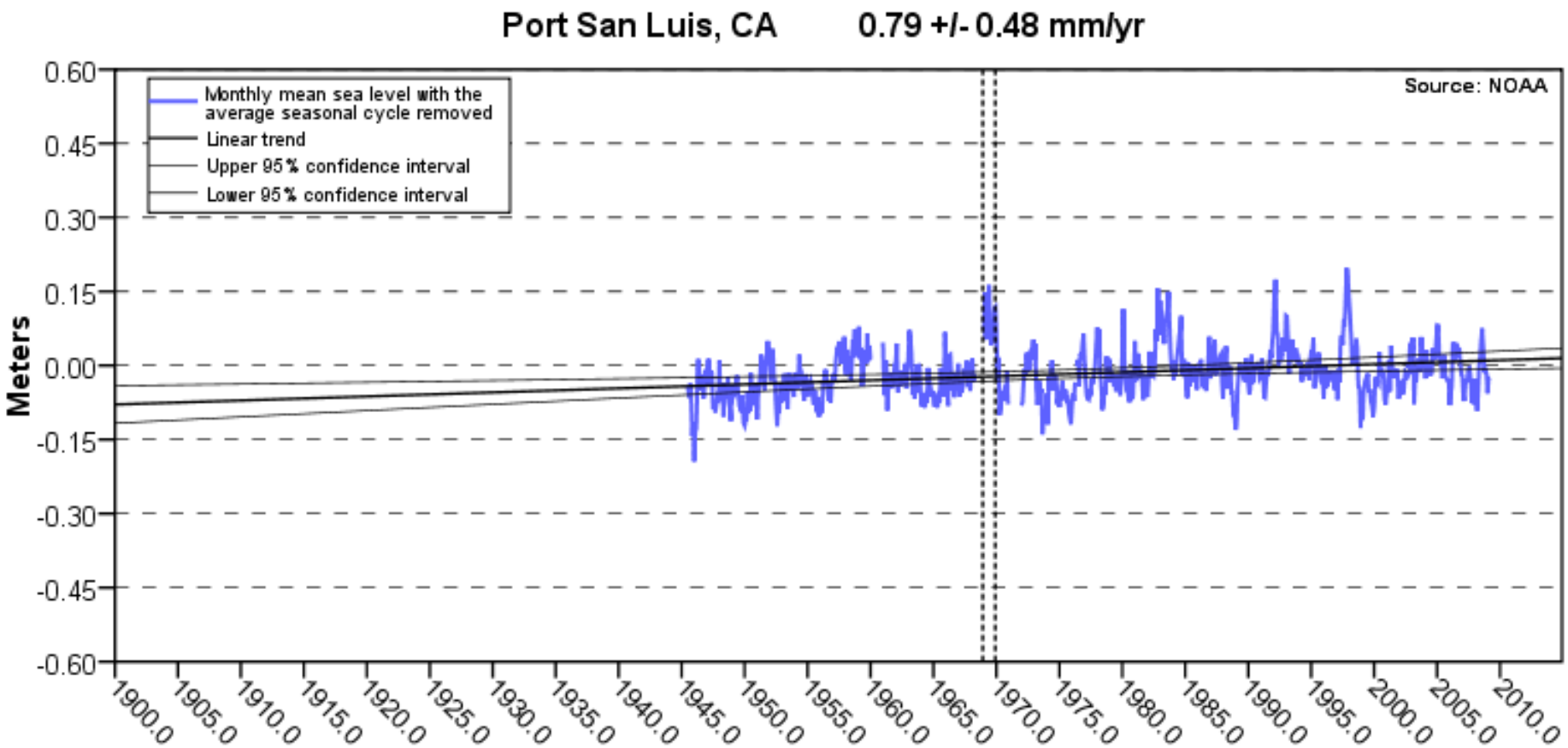
- Tides and Water Levels
- Waves
- Topography and Hydrography

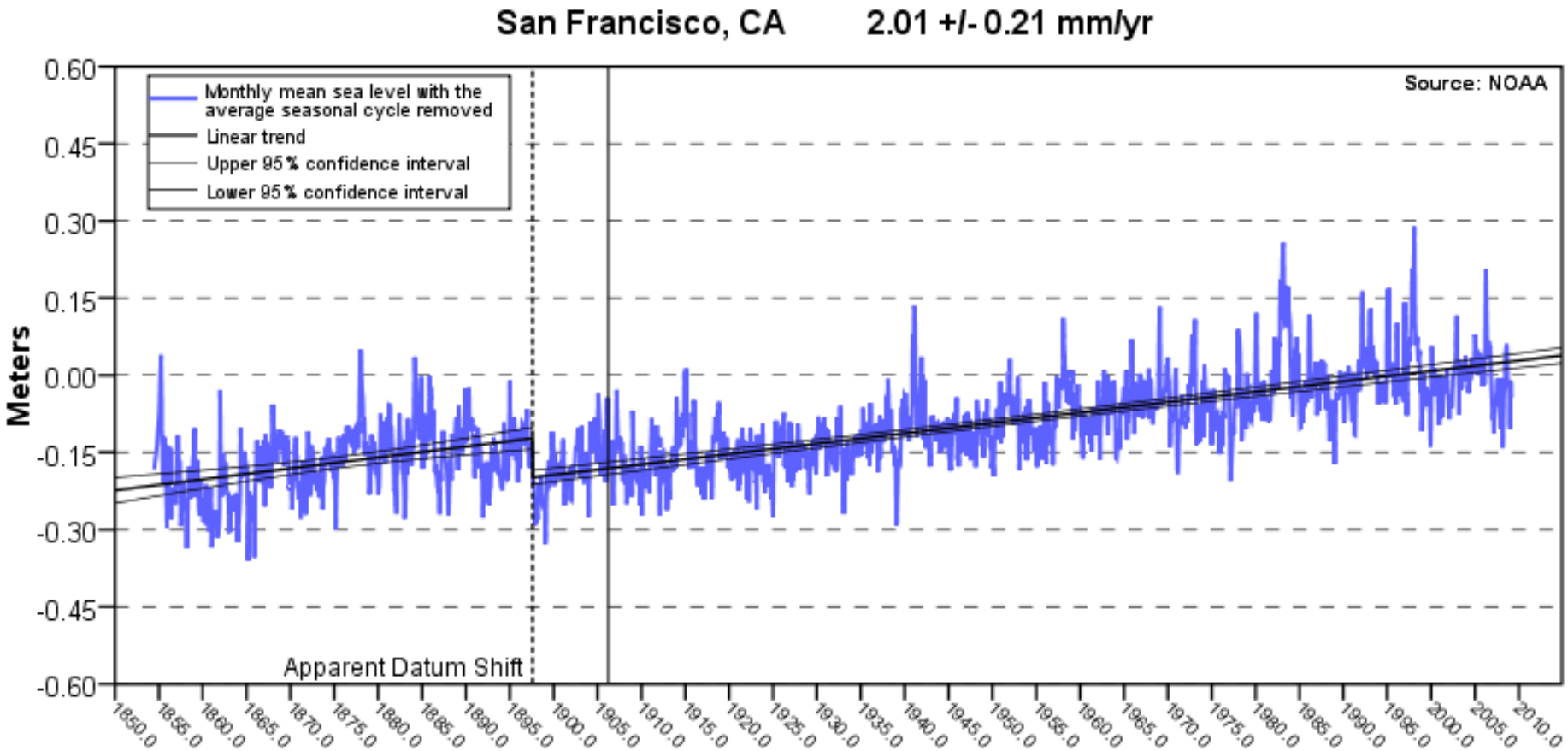
LONG TERM TIDE RECORDS




La Jolla, CA
2.07 +/- 0.29 mm/yr
Source: NOAA
Monthly mean sea level with the average seasonal cycle removed
Linear trend
Upper 95% confidence interval
Lower 95% confidence interval
Meters
0.60
0.45
0.30
0.15
0.00
-0.15
-0.30
-0.45
-0.60
1900.0
1905.0
1910.0
1915.0
1920.0
1925.0
1930.0
1935.0
1940.0
1945.0
1950.0
1955.0
1960.0
1965.0
1970.0
1975.0
1980.0
1985.0
1990.0
1995.0
2000.0
2005.0
2010.0


Los Angeles, CA 0.83 +/- 0.27 mm/yr
Source: NOAA
Monthly mean sea level with the average seasonal cycle removed
Linear trend
Upper 95% confidence interval
Lower 95% confidence interval
Meters
0.60
0.45
0.30
0.15
0.00
-0.15
-0.30
-0.45
-0.60
1900.0
1905.0
1910.0
1915.0
1920.0
1925.0
1930.0
1935.0
1940.0
1945.0
1950.0
1955.0
1960.0
1965.0
1970.0
1975.0
1980.0
1985.0
1990.0
1995.0
2000.0
2005.0
2010.0


Port San Luis, CA 0.79 +/- 0.48 mm/yr
Source: NOAA
Monthly mean sea level with the average seasonal cycle removed
Linear trend
Upper 95% confidence interval
Lower 95% confidence interval
Meters
0.60
0.45
0.30
0.15
0.00
-0.15
-0.30
-0.45
-0.60
1900.0
1905.0
1910.0
1915.0
1920.0
1925.0
1930.0
1935.0
1940.0
1945.0
1950.0
1955.0
1960.0
1965.0
1970.0
1975.0
1980.0
1985.0
1990.0
1995.0
2000.0
2005.0
2010.0


San Francisco, CA 2.01 +/- 0.21 mm/yr
Source: NOAA
Monthly mean sea level with the average seasonal cycle removed
Linear trend
Upper 95% confidence interval
Lower 95% confidence interval
Meters
0.60
0.45
0.30
0.15
0.00
-0.15
-0.30
-0.45
-0.60
Apparent Datum Shift
1850.0
1855.0
1860.0
1865.0
1870.0
1875.0
1880.0
1885.0
1890.0
1895.0
1900.0
1905.0
1910.0
1915.0
1920.0
1925.0
1930.0
1935.0
1940.0
1945.0
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1960.0
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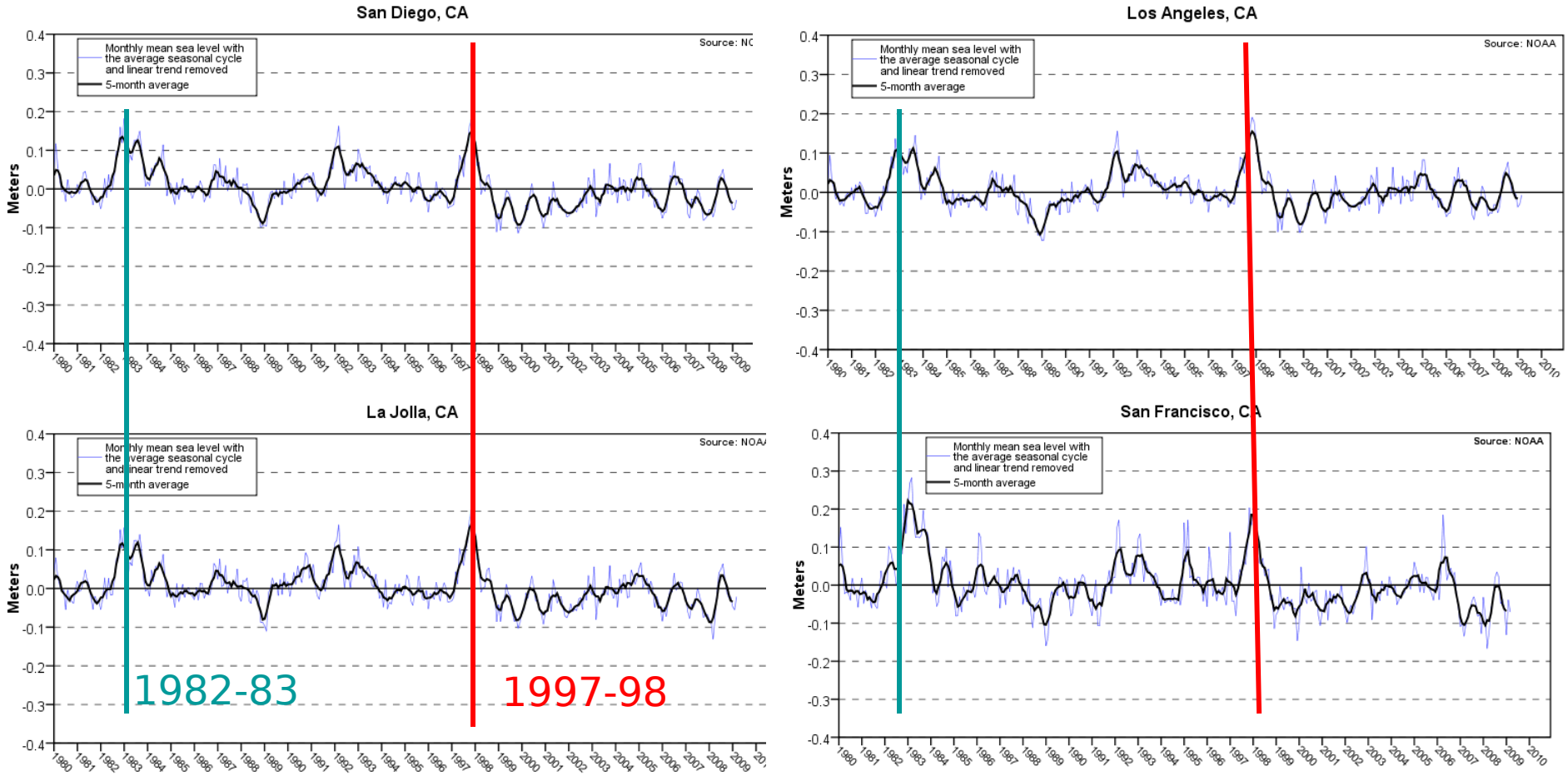
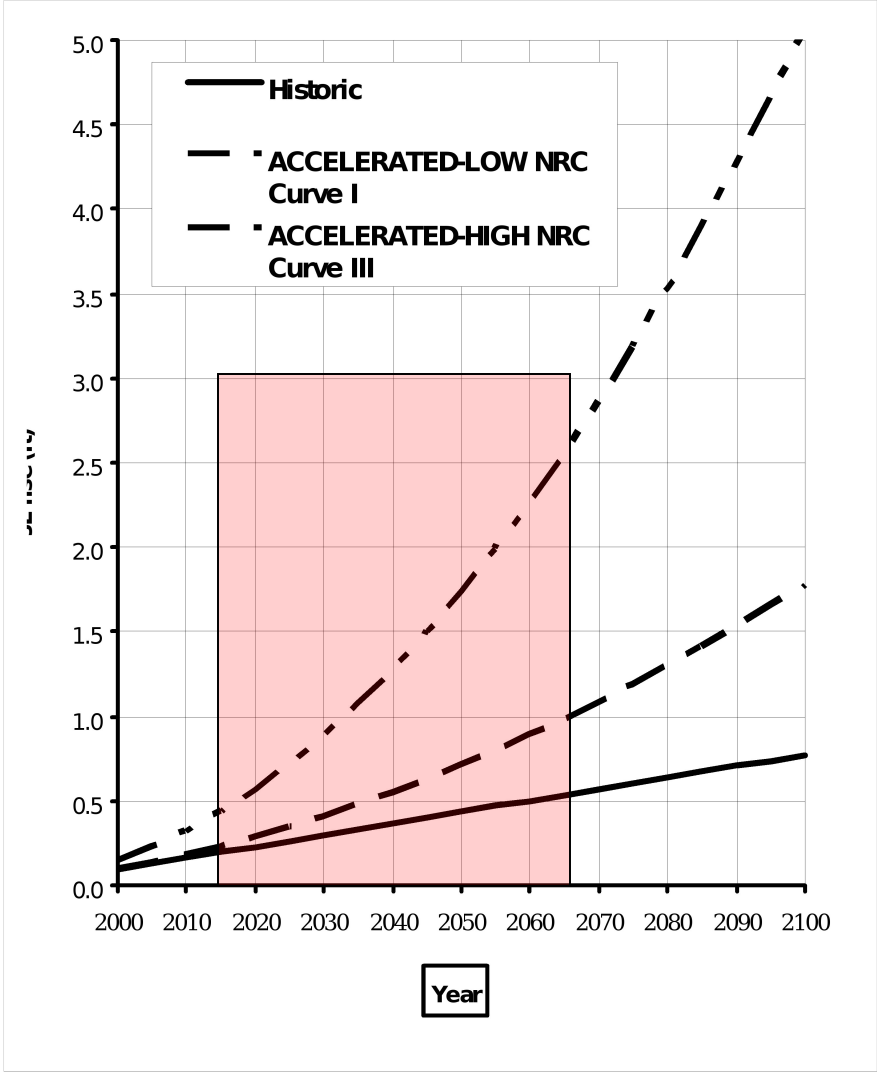
1975.0
1980.0
1985.0
1990.0
1995.0
2000.0
2005.0
2010.0

Los Angeles



INTERANNUAL VARIATIONS IN MONTHLY MEAN SEA LEVELS



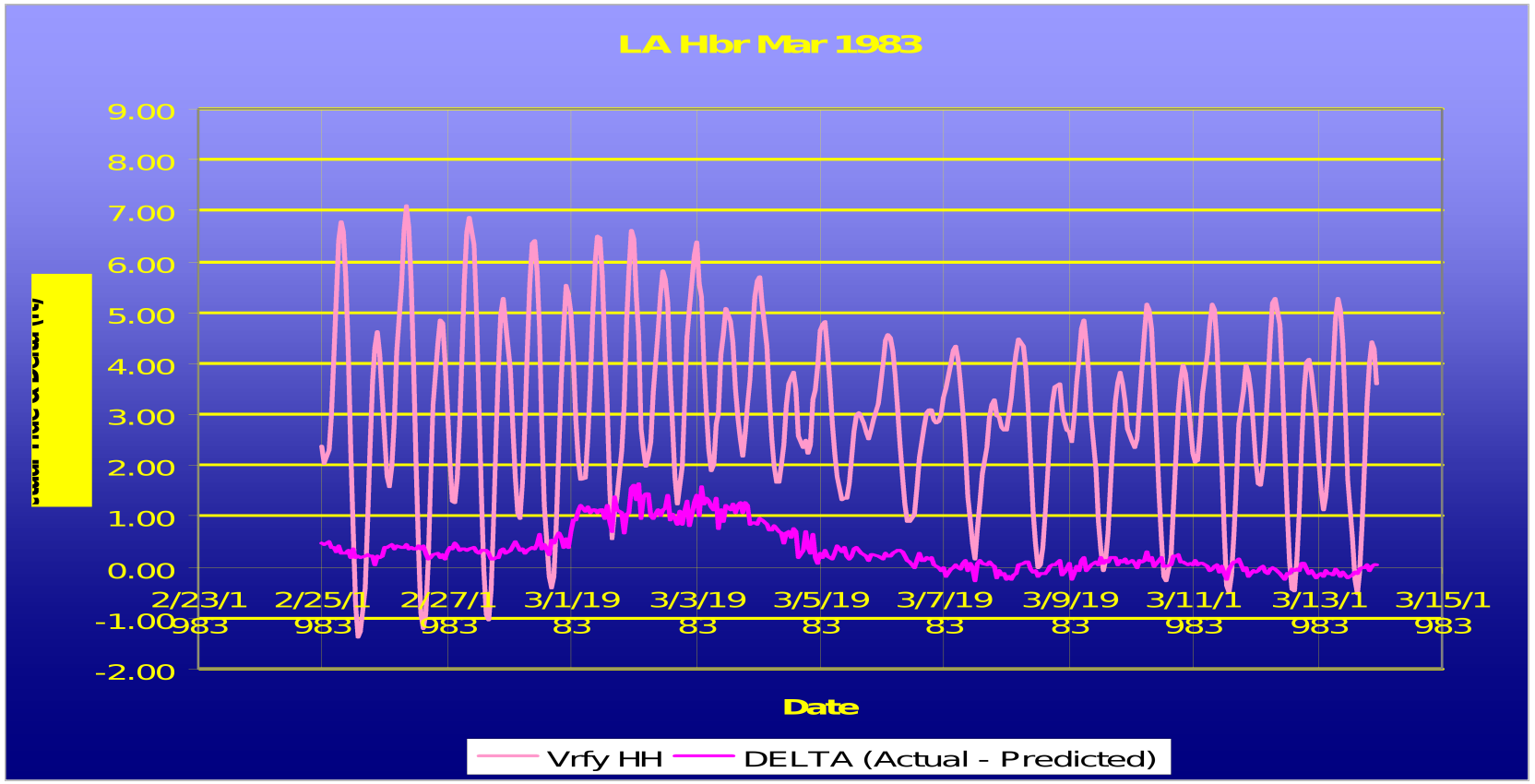
FUTURE SEA LEVEL RISE

La Jolla Tide Gage

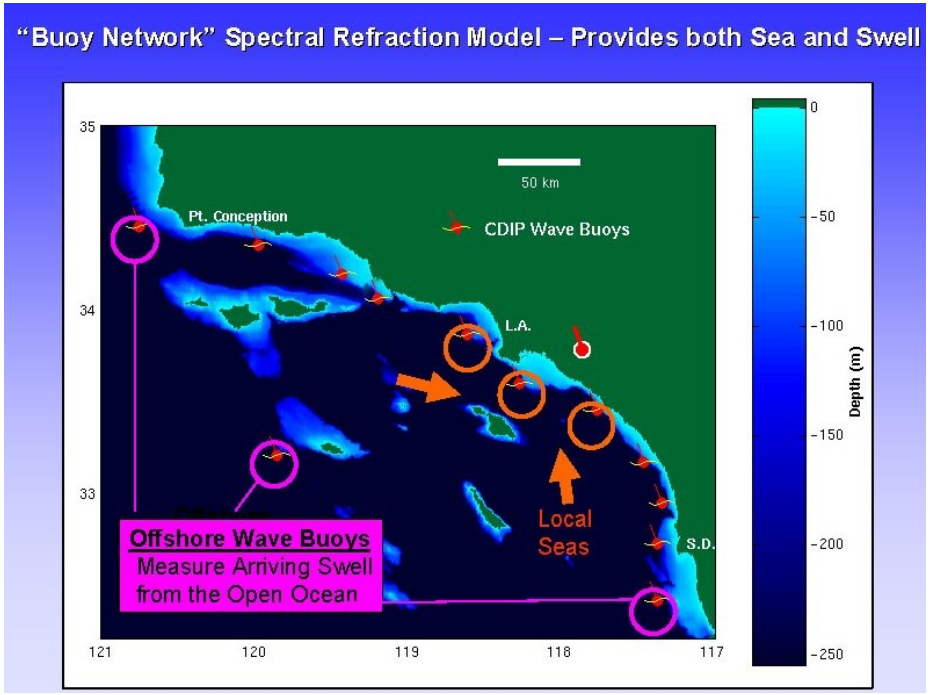
- Relative to 1983-2001 MLLW tidal epoch.
- 1997-98 ENSO already ½ foot above normal sea levels.
- Typical economic evaluation period of 50-years.

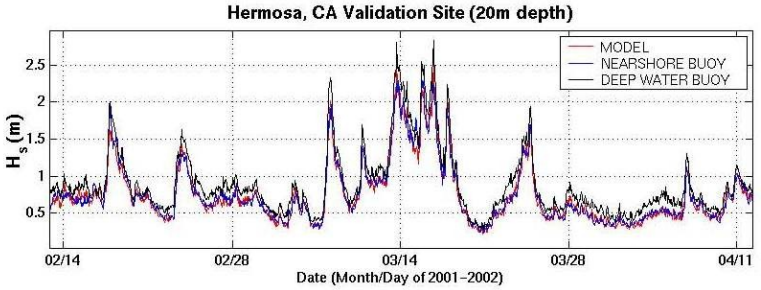
STORM SURGE AND TIDE

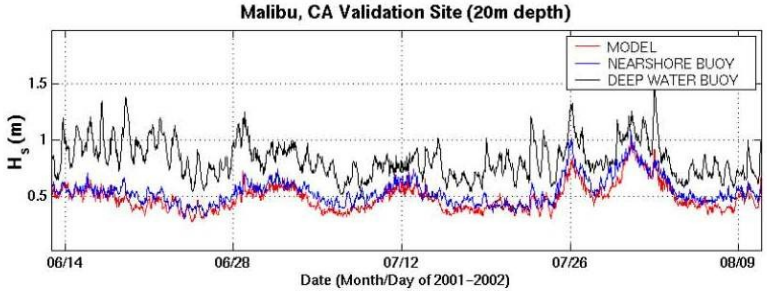
March 1983



WAVES


"Buoy Network" Spectral Refraction Model – Provides both Sea and Swell
50 km
Pt. Conception
CDIP Wave Buoys
L.A.
Local Seas
S.D.
Offshore Wave Buoys
Measure Arriving Swell from the Open Ocean
35
34
33
121
120
119
118
117
0
-50
-100
-150
-200
-250
Depth (m)


Hermosa, CA Validation Site (20m depth)
MODEL
NEARSHORE BUOY
DEEP WATER BUOY
H_s (m)
2.5
2
1.5
1
0.5
02/14
02/28
03/14
03/28
04/11
Date (Month/Day of 2001–2002)


Malibu, CA Validation Site (20m depth)
MODEL
NEARSHORE BUOY
DEEP WATER BUOY
H_s (m)
1.5
1
0.5
06/14
06/28
07/12
07/26
08/09
Date (Month/Day of 2001–2002)

CDIP - LA County Coastal Wave Prediction Model Study

Return to Home Page

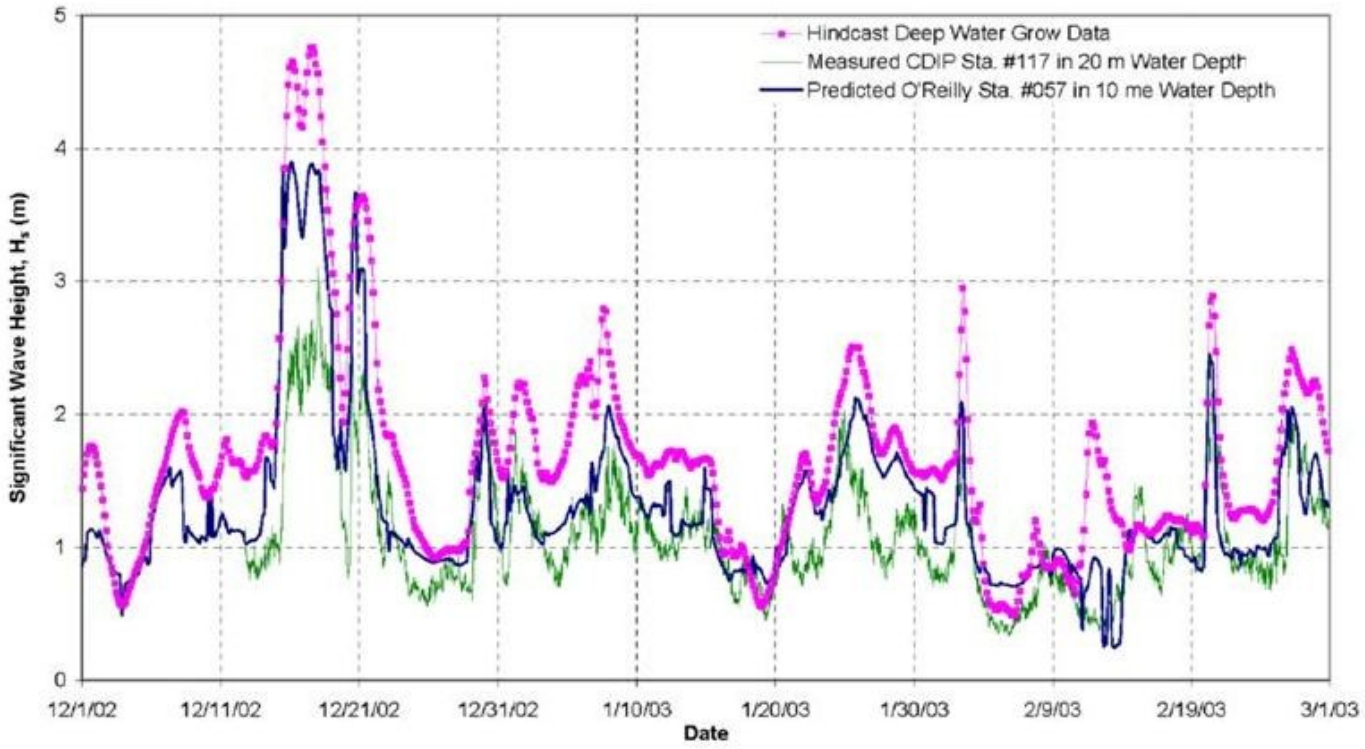
Regional Maps

Next UPCOAST Map

Next DOWNCOAST Map

Select site on map
or from list below

33| 34| 35| 36| 37| 38| 39|
40| 41| 42| 43| 44| 45| 46|
47| 48| 49| 50| 51| 52| 53|
54| 55| 56| 57| 58| 59| 60|
61| 62| 63| 64| 65| 66| 67|
68| 69| 70|

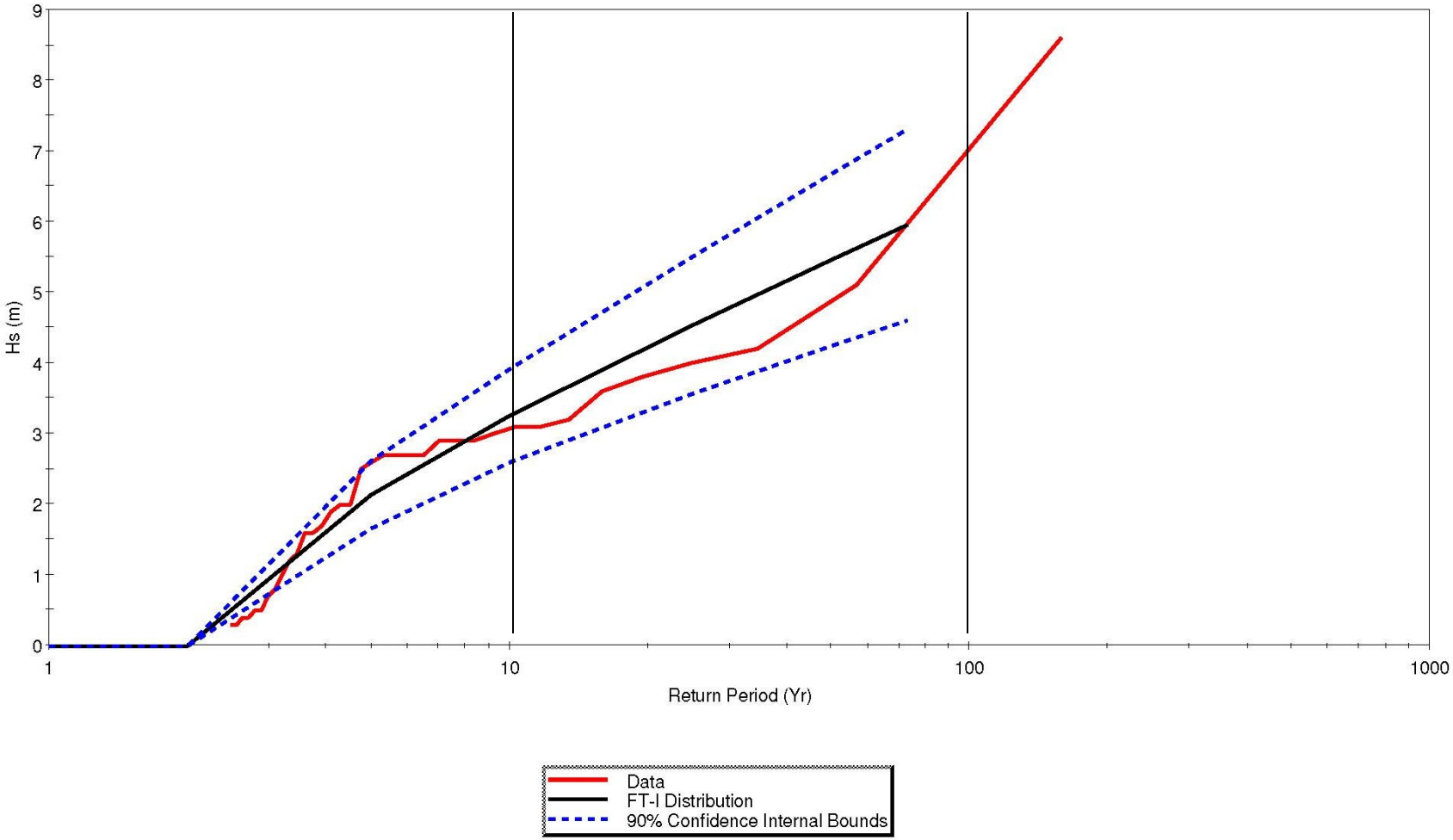


GROW DATA from Gpt 38190 1/1/1970 to 12/31/2005 transformed to nearshore locations to create 35-year hindcast.

US Army Corps of Engineers
Los Angeles District

FIGURE 3-7
Comparisons of Wave Height in Torrance Beach Region (Winter Season)

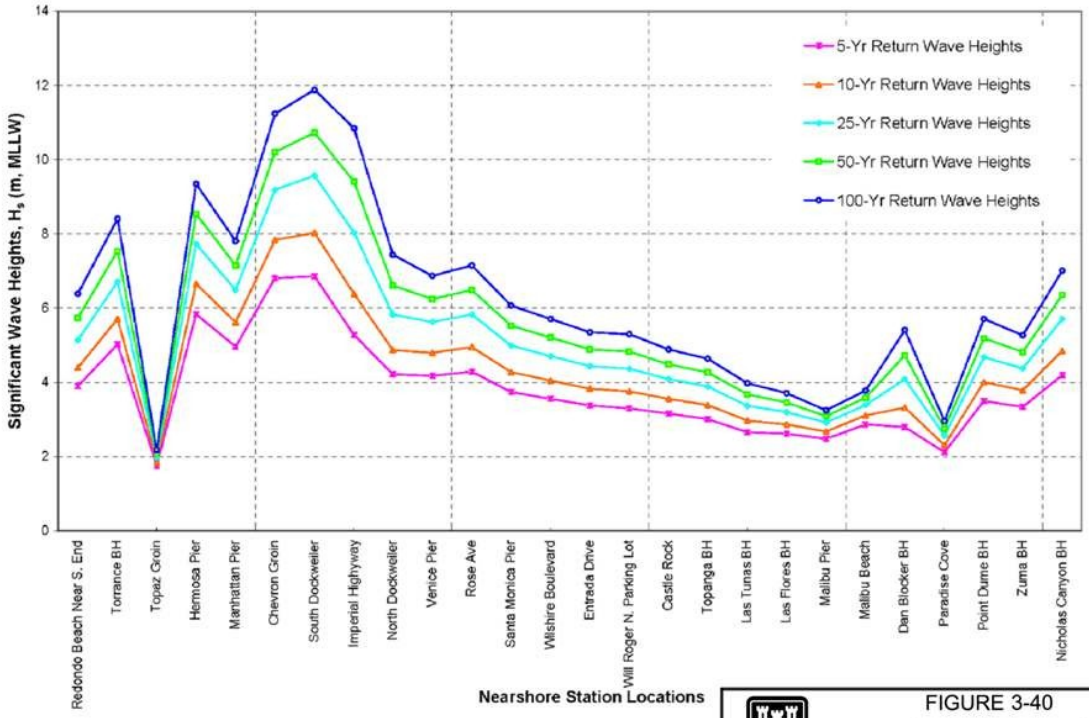
Extremal Significant Wave Height Distributions



Fisher-Tippett Distribution

LOS ANGELES COUNTY

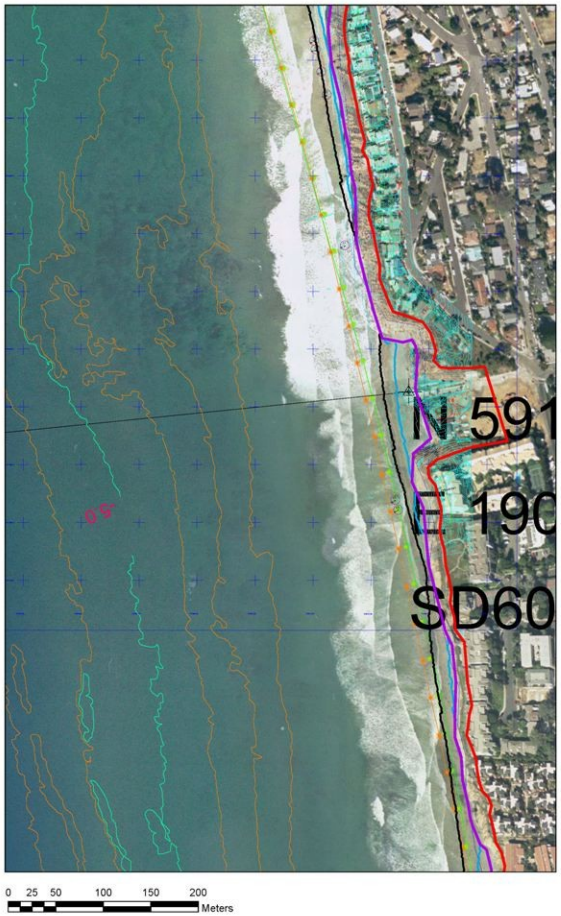
SPATIAL VARIATION IN EXTREME WAVE HEIGHTS



LIFE CYCLE ANALYSIS

- MONTE CARLO SIMULATION OVER PROJECT PERIOD.
- ENSO CORRELATES WITH ELEVATED WATER LEVELS AND ABOVE AVERAGE NUMBER OF EVENTS.
- PHASING WITH SPRING TIDE LARGE DETERMINANT.
- SEASONAL AND SHORT TERM SHORELINE RESPONSE HIGHLY VARIABLE.
- USE OF SYNTHETIC WAVE CLIMATES APPLIED.
- RUNUP AND OVER-TOPPING OVER NATURAL AND PROTECTED PROFILES IS CAUSE OF COASTAL FLOODING (at most SPL sites).

Topo and Hydro Data



Encinitas and Solana Beach Feasibility

- LIDAR and CHARTS to map bluff and infrastructure offsets.
- SANDAG multibeam and sea floor mapping used in environmental impact analysis.
- Coast of CA, SANDAG and City Sponsored beach profiling used for analysis of sand distribution in cross-shore dimension.

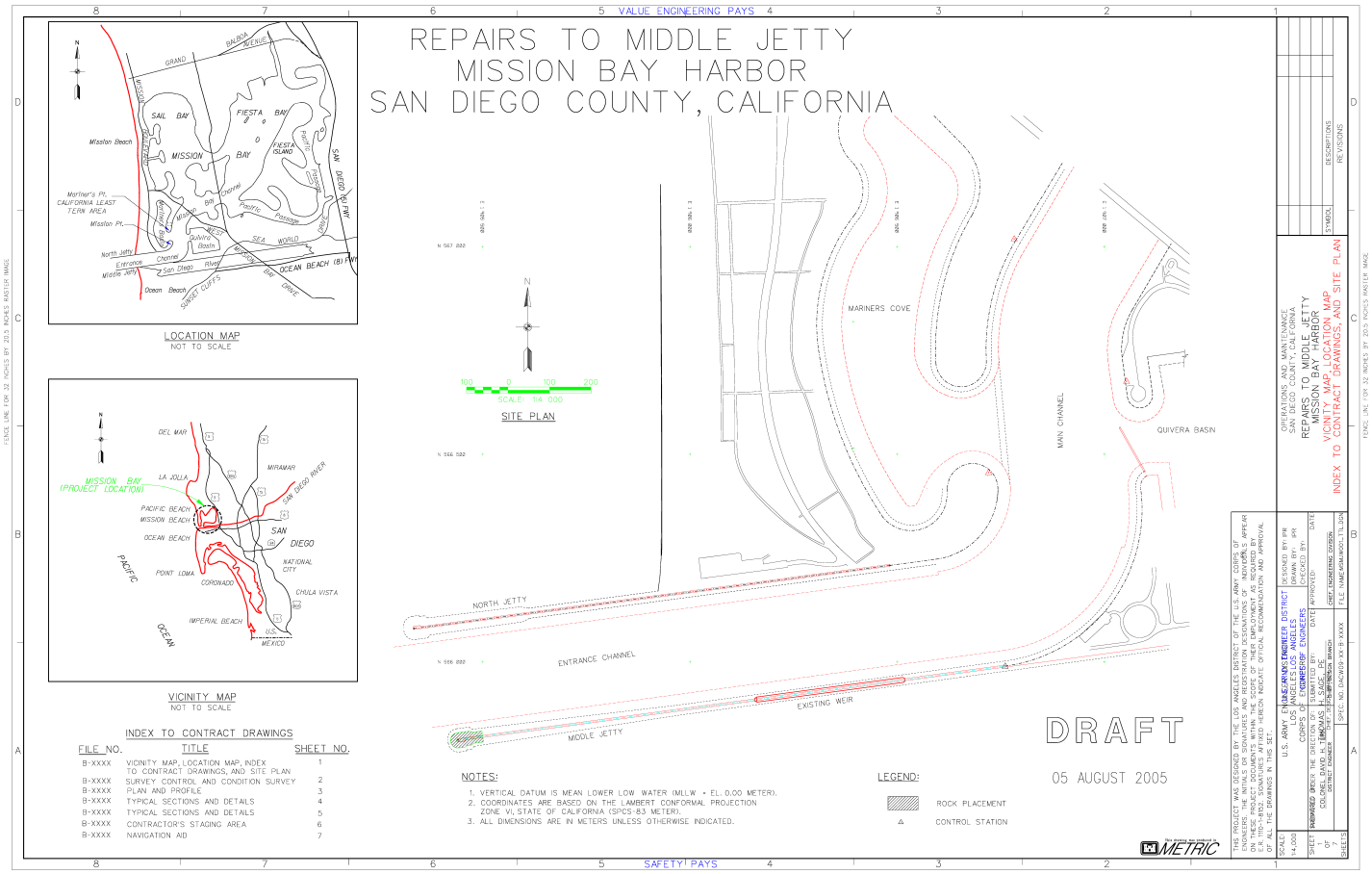
Topo and Hydro Data

Mission Bay Middle Jetty Repair Included in 2009 ARRA.

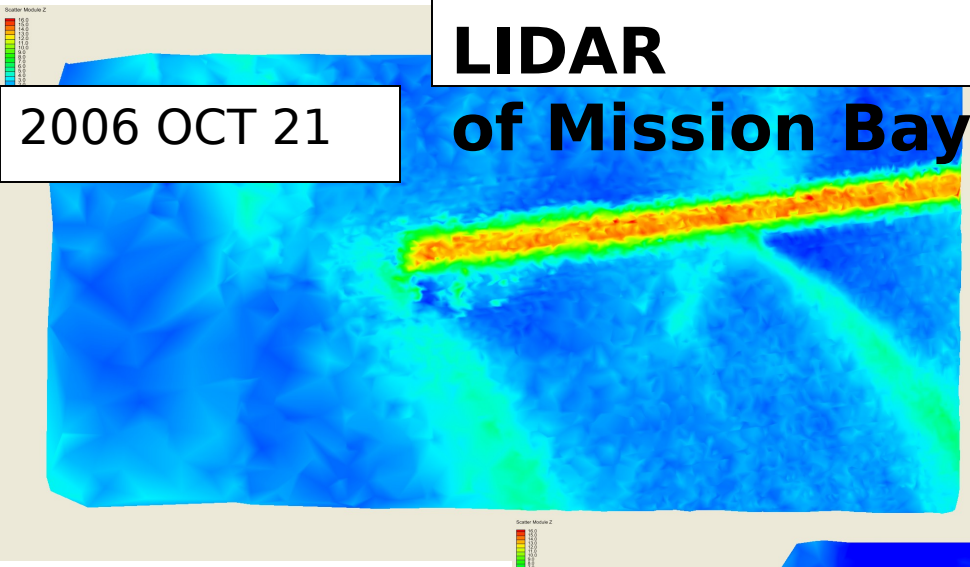
Missing seaward 200 feet, as of Apr 2009 LIDAR.

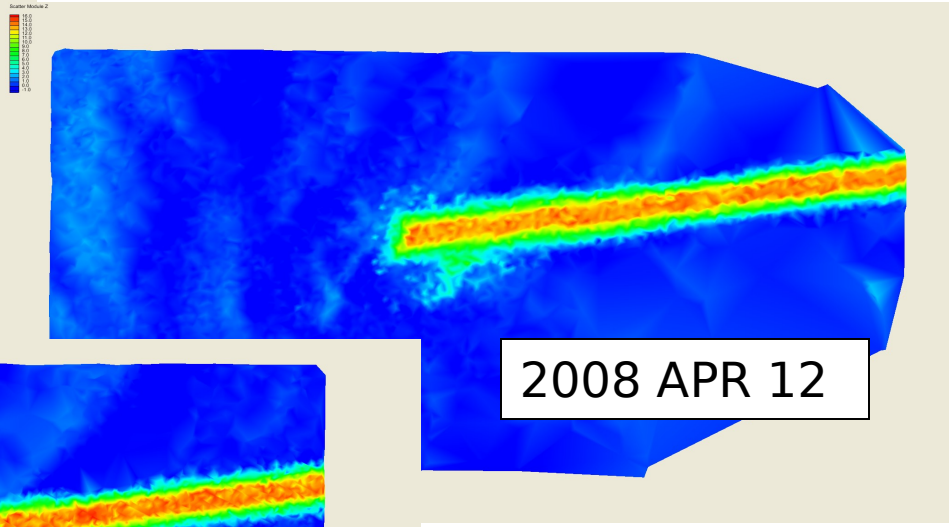
2004 CHARTS survey showed 150 feet missing.

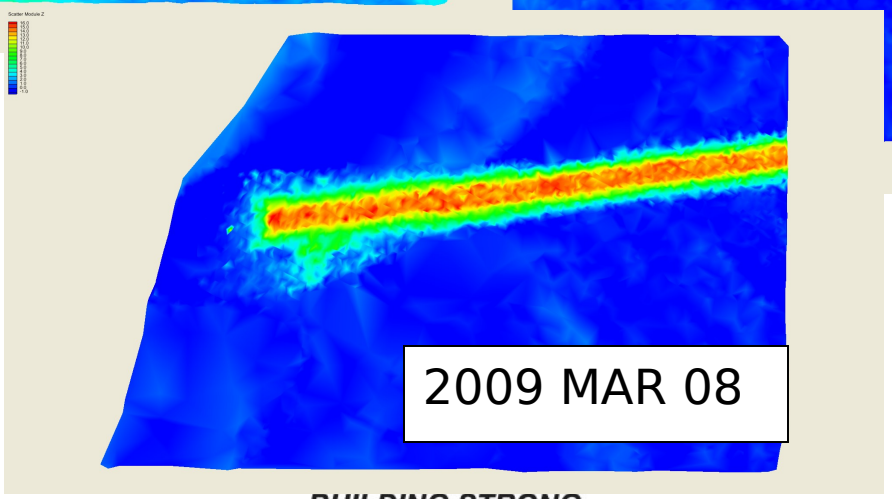
2009 ARRA Repairs to Mission Bay Middle Jetty


VALUE ENGINEERING PAYS
REPAIRS TO MIDDLE JETTY
MISSION BAY HARBOR
SAN DIEGO COUNTY, CALIFORNIA
LOCATION MAP
NOT TO SCALE
VICINITY MAP
NOT TO SCALE
SITE PLAN
INDEX TO CONTRACT DRAWINGS
FILE NO. TITLE SHEET NO.
B-XXXX VICINITY MAP, LOCATION MAP, INDEX TO CONTRACT DRAWINGS, AND SITE PLAN 1
B-XXXX SURVEY CONTROL AND CONDITION SURVEY 2
B-XXXX PLAN AND PROFILE 3
B-XXXX TYPICAL SECTIONS AND DETAILS 4
B-XXXX TYPICAL SECTIONS AND DETAILS 5
B-XXXX CONTRACTOR'S STAGING AREA 6
B-XXXX NAVIGATION AID 7
NOTES:
1. VERTICAL DATUM IS MEAN LOWER LOW WATER (MLLW = EL. 0.00 METER).
2. COORDINATES ARE BASED ON THE LAMBERT CONFORMAL PROJECTION ZONE VI, STATE OF CALIFORNIA (SPCS 83 METER).
3. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
LEGEND:
ROCK PLACEMENT
CONTROL STATION
NORTH JETTY
ENTRANCE CHANNEL
EXISTING WEIR
MIDDLE JETTY
MARINERS COVE
MAIN CHANNEL
QUIVERA BASIN
DRAFT
05 AUGUST 2005
OPERATIONS AND MAINTENANCE
SAN DIEGO COUNTY, CALIFORNIA
REPAIRS TO MIDDLE JETTY
MISSION BAY HARBOR
VICINITY MAP, LOCATION MAP
INDEX TO CONTRACT DRAWINGS, AND SITE PLAN
SAFETY PAYS

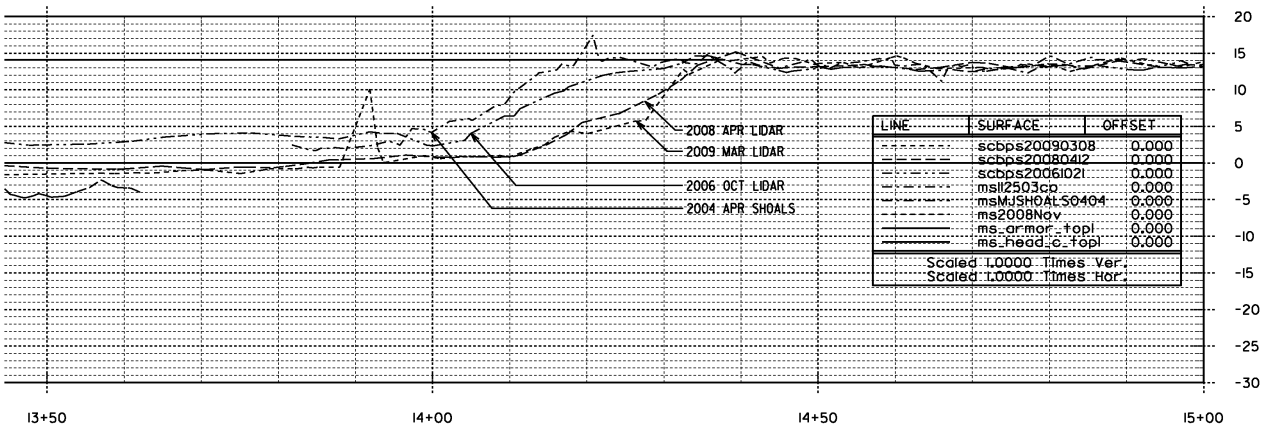
Southern California Beach Processes Study (SCBPS) LIDAR of Mission Bay Middle Jetty







2009 ARRA Repairs to Mission Bay Middle Jetty



- Regional High resolution LIDAR readily available.
- Difficult to predict, budget and schedule data need.
- In the “can” products facilitates rapid response with less guessing.

Field Trip

- 1330 – Leave Hotel (Lunch provided on Bus)
- 1400 – 1430 Tour and Presentation by Scripps of San Elijo Lagoon Mouth
- 1445 – 1530 Tour and Presentation by Solana Beach, Encinitas, Scripps and Corps of Solana Beach
- 1600 – 1645 Tour and Presentation by Scripps of Torrey Pines State Reserve
- 1715 - Return to Hotel